Draft Staff Proposal: Zero-Emissions Freight Infrastructure Planning

Energy Division Webinar

California Public
Utilities Commission

May 22, 2023

Webinar logistics

Webinar materials

- Webinar slides are available at the CPUC Transportation Electrification FIP webpage.
- The webinar will be recorded, with the recording posted to the same webpage.

Participation in the webinar:

- We invite clarifying questions using the “Q&A” chat feature of Webex
- All attendees have been muted. If time allows, verbal clarifying questions will be addressed at the end of the webinar. To ask questions verbally:
  - In Webex:
    - Please “raise your hand”
    - Webex host will unmute your microphone and you can proceed to ask your question
    - Please “lower your hand” afterwards
  - For those with phone access only:
    - Dial *3 to “raise your hand”. Once you have raised your hand, you'll hear the prompt, "You have raised your hand to ask a question. Please wait to speak until the host calls on you“
    - WebEx host will unmute your microphone and you can proceed to ask your question
    - Dial *3 to “lower your hand”

Opportunity to submit informal comments:

- Stakeholders are invited to submit informal comments after the webinar, per instructions to be provided later. Stakeholder comments will be posted to the CPUC TE FIP webpage.

Meeting Agenda

Item*	Time
1) Introduction & Housekeeping	**2:00 – 2:15pm**
2) Overview of Transportation Electrification Planning	**2:15 – 2:45pm**
a) Need for Proactive Infrastructure Planning	
b) Challenges Under Current Forecasting/Planning Processes	
3) Draft Staff Proposal: Zero-emission Freight Infrastructure Planning (FIP) Framework	**2:45 – 4:00pm**
a) FIP Overview	
b) FIP Framework Proposal	
c) Process Reform to Support MDHD Electrification	
4) FIP Implementation Assessment	**4:00 – 4:45pm**
a) Case Studies	
b) Development of Common TE Inputs and Assumptions	
5) Stakeholder Engagement – Schedule, Instructions, and Questions	**4:45 – 5:00pm**

**Time allocated for agenda items includes time for Q&A*

Webinar objectives and instructions

- Webinar objectives:
  - Provide timely information to stakeholders about staff’s planned, ongoing and completed activities.
  - Facilitate a technical discussion regarding the FIP proposal. Note - <u>this is not a forum for policy advocacy.</u>
  - Solicit and receive informal feedback from stakeholders on the provided materials.
- Participation in the webinar is open to the public. The information discussed and the comments provided by stakeholders either during the webinar or later in writing are not part of any active proceeding.
- Feedback received during and following the webinar may inform staff work products that may later be introduced into the formal record of a proceeding via a procedural vehicle (e.g., CPUC ruling) and stakeholders will then be able to provide formal comments.
- The topics to be addressed in this webinar and future webinars on the FIP are likely to become highly technical. Energy Division will do its best to provide materials and resources to facilitate understanding of these topics.
- Therefore, we ask that participants make a good faith effort to review and understand any materials provided in advance of the meetings. Participants must be willing to work constructively and collaboratively to advance the objectives of the webinar.

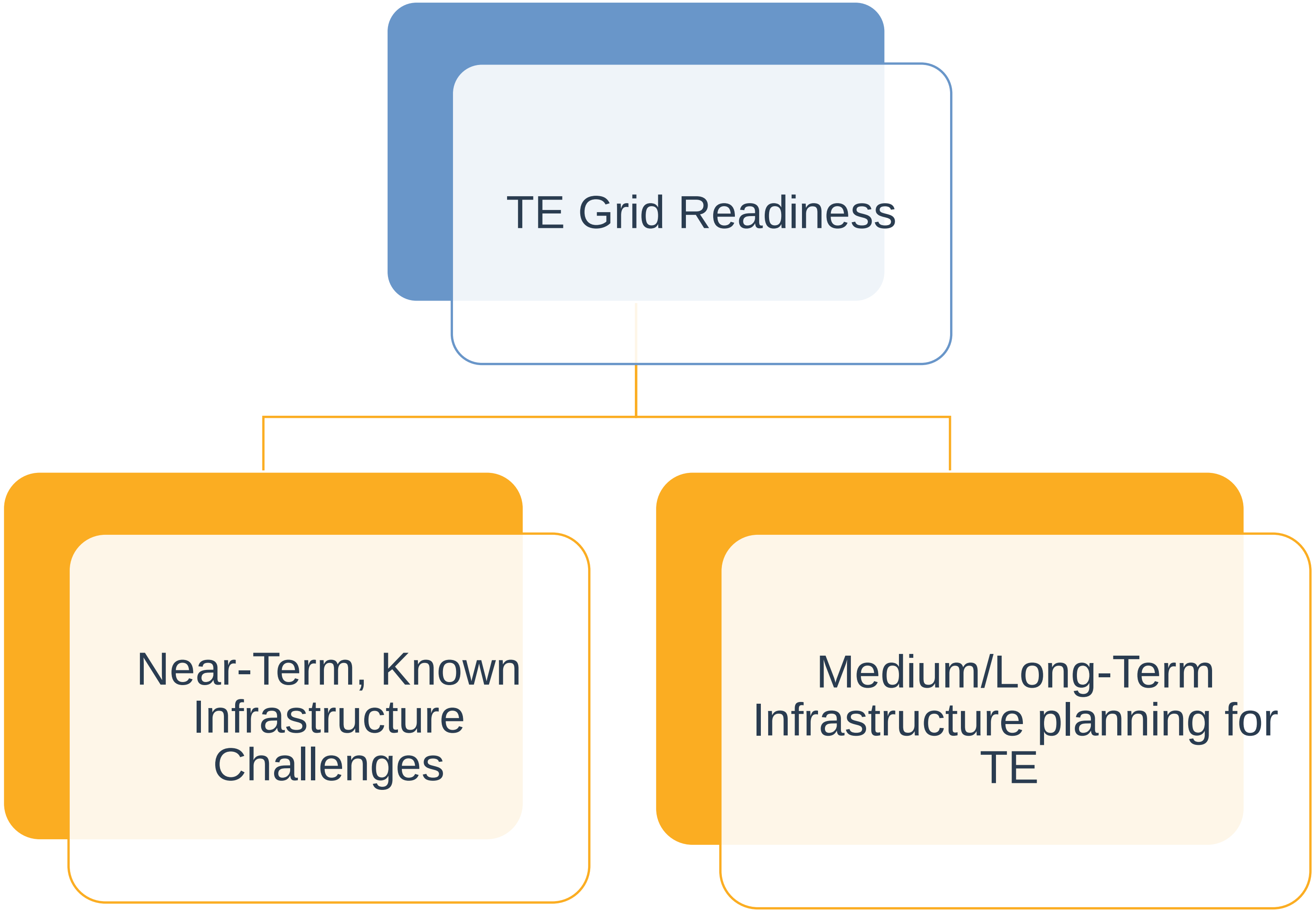
Acronyms

Acronym	Term
AATE	Additional Achievable Transportation Electrification
ACF	Advanced Clean Fleets
ACT	Advanced Clean Trucks
BTM	Behind the Meter/ Customer Side
CAISO	California Independent System Operator
CARB	California Air Resources Board
CEC	California Energy Commission
CED	California Energy Demand Forecast
CTC	California Transportation Commission
DAC	Disadvantaged Communities
DCFC	Direct Current Fast Charging
DDOR	Distribution Deferral Opportunity Reports
DIDF	Distribution Investment Deferral Framework
DPP	Distribution Planning Process
DER	Distributed Energy Resources
DRP	Distribution Resource Planning
EMFAC	Emission FACtor model
FIP	Freight Infrastructure Planning
FCEV	Fuel Cell Electric Vehicles

Acronym	Term
GNA	Grid Needs Assessment
GRC	General Rate Case
I&A	Inputs & Assumptions
ICA Map	Integration Capacity Analysis
IEPR	Integrated Energy Policy Report
IOU	Investor-Owned Utility
IRP	Integrated Resource Planning
JASC	Joint Agency Steering Committee
LD	Light-Duty
LSE	Load-Serving Entities
MDHD	Medium- and Heavy-Duty
POU	Publicly Owned Utility
TAC	Transmission Access Charge
TE	Transportation Electrification
TOU	Time of Use Rate
TPP	Transmission Planning Process
VMT	Vehicle Miles Traveled
ZEV	Zero Emission Vehicle

Overview of Transportation Electrification Planning

Grid readiness addresses near-term and medium/long-term TE infrastructure needs



Near-term, known infrastructure challenges

- **Purpose**: Identify and address near-term financial and staffing resource constraints that impact the ability of customers to plan, build, and energize charging to support accelerated ZEV adoption.

- **Two Distinct Challenges**:

Energization	Known Load Projects
• Barriers to achieving compliance with the adopted EV Service Energization timing requirements (average 125 business days) for projects that take service under the EV Infrastructure Rules.	• Delays involved with upgrading some upstream distribution infrastructure for projects that involve Rule 15, substation upgrades, and other projects that exceed 2MW, which lead to significant delays for customers planning to build charging in the near-term.

- Near-term, known challenges <u>will be addressed outside of FIP</u>
  - More details regarding these issues will be provided shortly
  - Staff are working to address these issues in coordination with intersecting processes — GRC, High DER, Rule 15, Rule 16, and Rule 29/45 Energization, IOU processes, etc.
  - Additional issues under investigation on parallel tracks: IOU Load ICA Map improvements, quantifying ability of DERs and VGI to potentially defer upgrades, aligning interconnection and energization processes.

Medium/long-term infrastructure planning process

- Medium/long-term planning (3 to 20-yr time horizon) identifies the generation and infrastructure needed to enable the state’s electric procurement policies and programs, while ensuring that California has a safe, reliable, and cost-effective electricity supply.
  - Distribution and generation planning is overseen by the CPUC.
  - It is typically conducted by the CPUC-jurisdictional LSEs (not POUs) using a 3 to 20-year planning horizon and the CEC’s energy demand forecasts.
  - The CPUC is responsible for determining if identified generation and distribution infrastructure can be recovered in electric rates.
  - Modelling methodology and inputs/assumptions are updated periodically.

What is the FIP Framework?

- The FIP Framework discussed today is a staff proposal for how to develop “investment grade” inputs/assumptions and MDHD charging scenarios to be used in long-term grid planning to identify MDHD freight electric infrastructure needs.
- The FIP Framework, as proposed, facilitates the identification of <u>medium/long-term TE electrical infrastructure needs</u>.
  - FIP plans for to-the-meter (utility-side) infrastructure (distribution, substation and transmission), <u>not behind-the-meter infrastructure for chargers.</u>
  - FIP is focusing on MDHD freight in the implementation assessment because it will have significant and localized impacts on the electric infrastructure.
- Proactive identification of TE electrical infrastructure necessary to accommodate future loads will reduce the likelihood that long-lead upgrades are not online when necessary.
- Staff will work with stakeholders during FIP implementation to identify other vehicle classes/types that are dependent on long lead time infrastructure, e.g., LDV DCFC and FCEV, etc.

Scope of today's FIP webinar discussion

In Scope for Webinar Discussion

- Long-term planning and forecasting process alignment (*e.g., between DRIVE, DPP, IRP, CEC IEPR, TPP*)
- Common interagency inputs and assumptions regarding MDHD planning/forecasting (*e.g.,* MDHD charging behavior, MDHD electric load, and charger zones)
- Proactive planning of long lead time electric infrastructure (e.g., distribution, substation, transmission, and generation resources) needed to effectively deploy chargers to meet MDHD targets

Out of Scope for Webinar Discussion

- Short-term infrastructure planning (< 3 years)
- Site/circuit level capacity mapping (i.e., Load ICA maps)
- Energization timing issues (i.e., IOU staffing, resources, and prioritizations)
- Current and near-term EV projects in the utility queue (i.e., currently known distribution investment needs)
- Long-term planning process alignment with existing transportation planning processes
- High-DER proceeding

Proactive Infrastructure Planning is Needed to Support Freight Electrification

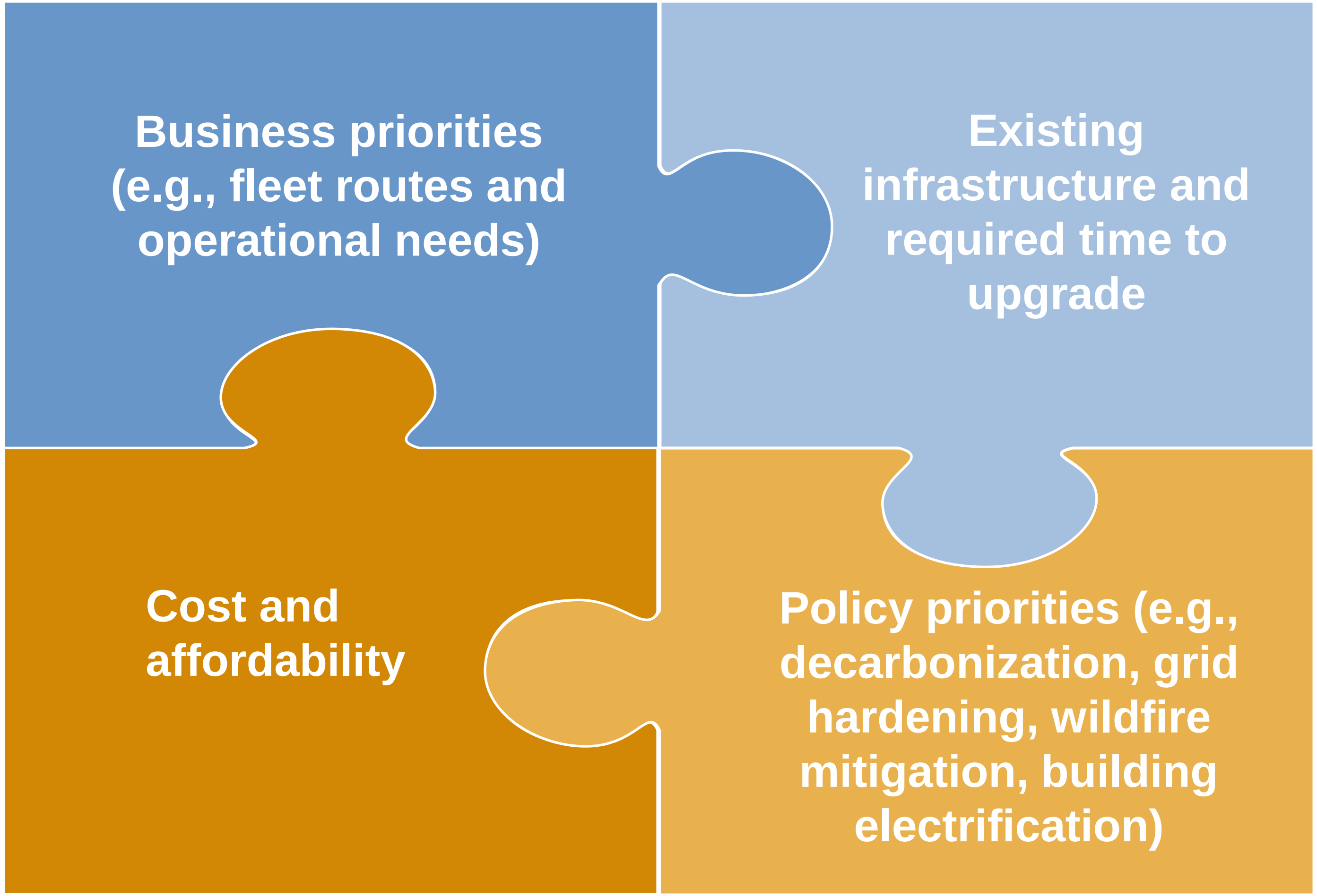
Background – CARB zero-emission freight regulations

- CARB has adopted a suite of regulations[1] that will transform the CA vehicle fleet to zero-emission~~s~~. Included in this portfolio are:
  - The Advanced Clean Cars II regulation requires increasing the ZEV percentage of <u>sales of new cars</u> from 35 percent in 2026 to 100 percent by 2035.
  - The Innovative Clean Transit regulation transitions <u>all</u> public transit buses to zero-emission by 2040.
  - The Advanced Clean Trucks regulation requires increasing the ZEV percentage of <u>sales of new trucks</u> through 2036.
  - The Advanced Clean Fleets regulation requires the transition of drayage trucks, public fleets, and high priority fleets to zero-emission through vehicle replacements or fleet composition requirements starting in 2024.
- In aggregate, these regulations will result in significant and concentrated electrical load in various locations. This will involve significant grid upgrades, grid integration challenges, and large-scale public charger deployment.
- <u>This infrastructure planning proposal will initially focus on the infrastructure needed for medium- and heavy-duty fleet electrification.</u>
  - This is because MDHD freight will have significant and localized impacts on the electric infrastructure

[1] <u>Advanced Clean Fleets Regulation Summary | California Air Resources Board</u>

Accelerated electrification results in additional complexity for State's planning/forecasting processes

- Significant interactive effects exist between transportation electrification, building electrification, electric sector decarbonization, grid hardening, and affordability
- Effective planning/forecasting must:
  - Ensure comprehensive consideration of key risks, uncertainties, and opportunities while ensuring affordability and reliability
  - Consider the business priorities of other sectors of the economy (e.g., freight), which the CPUC doesn't regulate
  - Elevate potential energy and non-energy sector tradeoffs to decisionmakers



Proactive planning requires significant interagency coordination

Timely deployment of MDHD-related electric infrastructure can only happen with close coordination between energy, transportation, and air quality agencies

California Air Resources Board	• Sets emissions targets for each sector (i.e., transportation, electric, etc.) to achieve health-based air quality standards and climate targets. • Adopts zero-emission regulations for LDV and MDHD vehicle transition to zero emission technologies. • Adopts fuels regulations that decrease the carbon intensity of motor vehicle fuels (LCFS).
California Energy Commission	• Develops and adopts the annual CED Forecast as part of the IEPR (often called the IEPR Forecast), which incorporates demand from existing or reasonably expected CARB regulations where possible. • Assesses biennially, per AB 2127 and Executive Order N-79-20, the electric vehicle charging infrastructure needed to support state ZEV adoption goals.
California Public Utilities Commission	• Oversees and authorizes investments in generation and distribution, informs transmission planning and investments, and ensures a reliable and affordable electric system. • The various CPUC planning processes depend on the CEC demand forecast for planning.
Independent System Operator	• Authorizes transmission investments based on generation portfolios prepared and adopted by the CPUC and a demand forecast adopted by the CEC.
California Transportation Commission	• Responsible for programming and allocating funds for the construction of highway, passenger rail, transit and active transportation improvements throughout California. • The CTC works with Caltrans on transportation infrastructure planning and implementation.

California’s electric sector planning processes

Process Type	Planning Process	Overview
Regulatory	CARB ZEV Regulations	• Adopted zero-emission regulations for LDV/MDHD vehicle transition from fossil fuels
Forecasting	CARB Scoping Plan and State Implementation Plan	• Economy-wide plan to reach GHG targets • Updated every 5 years • Statewide plan for achieving air quality standards
	CEC Integrated Energy Policy Report (IEPR) CED Forecast	• Demand forecast used for infrastructure and reliability planning • Updated annually
Planning	CPUC Distribution Planning Process (DPP)	• Utilities use the statewide IEPR to forecast distribution overloads and deficiencies • Projects are planned to upgrade the distribution system out to 5 years • When feasible, DERs are used to defer traditional upgrades out to 10 years
	CPUC Integrated Resource Plan (IRP)	• Establishes GHG target within CARB’s range for CPUC-jurisdictional LSEs • Develops portfolios of electricity resources to meet state's GHG reduction goals while maintaining reliability at the lowest possible costs • Orders procurement and oversees compliance • Transmits generation portfolios to CAISO for use in its TPP
	CAISO Transmission Planning Process (TPP)	• Assess transmission needs • Approves transmission projects • Updated annually
	LSEs Planning & Procurement	• Plans filed per SB 350 and CPUC guidance • Procurement in compliance with CPUC directives • Percentage of CA load: IOUs ~75%, POUs ~25%

The CEC’s IEPR forecast is the starting point for distribution, transmission, and generation planning.

Planning for High TE has already begun

- CPUC's generation and distribution planning and the CAISO's transmission planning starts with the CEC adopted IEPR mid-case energy demand forecast.[1]
- The IEPR forecast has historically forecasted adopted regulation (e.g., Advanced Clean Trucks) and funded incentive programs.
- To kick-start infrastructure and generation planning in anticipation of ACF adoption, CEC worked with CPUC, CAISO, and CARB to develop a policy-based forecast based on draft ACF regs, for use in planning. This high TE forecast[2] was adopted in May 2022 as an addition to the 2021 IEPR[3] (Inter-Agency High Electrification scenario and Additional Transportation Electrification scenario).
- The three IOUs are using this forecast for their Distribution Planning Process (DPP), and respective 2023 GNA/DDORs, which are due Q3 2023.
- IRP used the Additional Transportation Electrification scenario in 2022 to develop a high electrification generation portfolio reflecting a 30 MMT emission limit in 2030. This portfolio is being used as policy-driven sensitivity in the CAISO's 2022-2023 TPP. TPP results will be finalized in May 2023. Beginning in IEPR 2022, CEC's Planning Forecast expanded to formally include impacts from ACF.
  - See Additional Achievable Transportation Electrification Scenario 3 (AATE 3) of the 2022 IEPR forecast[4]
  - modeled MDHD energy demand resulting from ACF and ACT.

1) See slide 57 and 58 for additional information.
2) https://www.energy.ca.gov/sites/default/files/2023-02/Adopted_2022_IEPR_Update_with_errata_ada.pdf p. 43
3) Resolution No: 22-0524-5 (ca.gov)
4) https://www.energy.ca.gov/sites/default/files/2023-02/Adopted_2022_IEPR_Update_with_errata_ada.pdf

Additional MDHD-related assessments outside of CPUC planning processes

- The California Department of Transportation (Caltrans) and the CTC have existing transportation planning processes that are similar to energy planning processes. Some of these key planning processes and resulting documents are:
  - The Interregional Transportation Strategic Plan provides direction to programs, districts, and partner agencies on the policies and strategies that should be considered when assessing the interregional transportation system and identifying improvements.
  - The California Freight Mobility Plan is California's state freight plan. It identifies freight corridors, includes a fiscally constrained infrastructure funding plan, includes investment priorities, and discusses the condition of freight infrastructure in the state.
  - The SB 671 Clean Freight Corridor Efficiency Assessment is an initial zero-emission freight infrastructure assessment that identifies freight corridors, or segments of corridors, and the infrastructure needed to support the deployment of zero-emission medium and heavy-duty vehicles.
    - This Assessment will be used to identify challenges related to timing, costs, and economic impacts to the Legislature.
    - SB 671 requires the CEC and CARB to incorporate, to the extent feasible and applicable, the Assessment's findings and recommendations into their programs and guidelines documents related to freight infrastructure and technology.
    - This Assessment will not directly result in electric grid infrastructure authorizations or cost recovery because that is within the CPUC's jurisdiction.

Accelerated Electrical Infrastructure Deployment is Challenging for Current Forecasting/Planning Processes

Accelerated electrical infrastructure deployment is challenging for current forecasting/planning processes

- The “just-in-time” planning and cost recovery approach does not provide enough flexibility to consider long lead time assets and authorize infrastructure sufficiently in advance.
- Approximately 3 years are required for the sequenced statewide planning efforts to be completed and result in infrastructure authorizations (i.e., IEPR, DPP, IRP, and TPP). This doesn’t include the time for CPUC cost recovery approval.
- A vetted common set of TE inputs and assumptions that can be used by all interagency planning/forecasting processes does not exist, resulting in agencies studying different TE futures.
- Significant market/tech uncertainty (e.g., % RE Hydrogen electrolysis, supply chain constraints, public chargers vs. catenary/overhead charging) impacts state’s ability to proactively authorize infrastructure solutions.
- There is no infrastructure planning process for renewable hydrogen.

Accelerated electrical infrastructure deployment is challenging for current forecasting/planning processes (contd.)

- Risks and uncertainties regarding load that is dependent on large-scale infrastructure buildout are not adequately quantified within existing state planning and forecasting processes. Various risks could impact MDHD adoption patterns and associated forecasting:
  - Unanticipated long-term electric rates
  - Delayed construction of MDHD and LDV DCFC distribution/transmission infrastructure
  - Misalignment of eventual MDHD and LDV DCFC charging behavior as compared to what is planned for
- Lack of granular MDHD load forecast
  - Current process: IOUs disaggregate the CEC’s IEPR TE forecast, a system-level forecast. IOUs use this disaggregated forecast plus known projects to do distribution planning.
  - Challenge: this process poses challenges for MDHD loads because of uncertainties with patterns of load that will eventually emerge on freight corridors and in areas with a high concentration of warehouses and logistics facilities.

Accelerated electrical infrastructure deployment is challenging for current forecasting/planning processes (contd.)

- There is no existing source of information on future fleet charger locations, yet long-term grid infrastructure planning needs to take fleet needs into account because most truck routes are not flexible, i.e., grid planning should not result in fleets deviating from their most economic route.
  - The SB 671 Assessment has provided some direction by identifying a minimum viable network of public charging stations that should be built along the top 6 freight corridors. However, specific locations for infrastructure along these corridors still needs identified, and optimal locations elsewhere in the state also need to be identified.
- There is no planning framework that can optimize fleet business needs with electric sector goals and requirements (i.e., how to cost effectively upgrade the distribution and transmission system)
- No process for identifying long-term substation land acquisition needs
  - TE load growth will occur throughout an IOU's service territory, in many cases in areas where it is not possible to expand the physical perimeter of a substation. In such cases, the areas are fully developed, and any vacant land is scarce and expensive.
  - The simplest solution: procure the land for substation upgrades in anticipation of new build. However, there is no planning process to identify these long-term land acquisition needs.

Draft Staff Proposal: Zero-Emission Freight Infrastructure Planning (FIP) Framework

FIP Overview

- Objectives
- Proposed reforms
- Workflow diagram
- Potential questions to be addressed by FIP process

FIP is needed for proactive MDHD infrastructure planning

- Overarching FIP objectives
  - Ensure that MDHD freight electrification doesn't compromise electric sector rates, reliability, and resiliency.
  - Facilitate achievement of CARB's recently adopted Advanced Clean Fleets (ACF) regulation as a priority, and potentially of ACT and other regulations subsequently
- Objectives achieved by proactively planning for long lead time distribution and transmission infrastructure upgrades needed to support MDHD freight electrification are the following:
  - Coordinating planning inputs and assumptions across existing long-term forecasting/planning processes to identify expected loads for use in distribution, transmission, and generation planning
  - Identifying needed process reforms to support proactive planning
  - Establishing a process for TE planning to inform charger infrastructure funding
  - Informing TE policy to support accelerated ZEV adoption over the next 3 to 20 years
- Over time, the scope of FIP could be expanded to include additional TE market segments if they are dependent on long lead time infrastructure (e.g., LDV charging plazas and hydrogen fueling).

Proposed reforms

- **Reform 1**: Establish process for developing common MDHD inputs for use in DPP, IRP, IEPR, and GRC
  - Establish fleet-centric stakeholder process that vets forecasting/planning inputs and charger scenarios
- **Reform 2**: Implement MDHD IEPR forecasting process that better considers infrastructure risk and timing by studying a wider range of scenarios
  - Risks that could impact MDHD adoption forecast:
    - Uncertainty regarding long-term electric rates and how they will impact MDHD electric vehicle adoption
    - Delayed construction of distribution/transmission infrastructure
    - Future charging behavior (e.g., load shapes) of MDHD and LDV DCFC is different than what was assumed in planning, resulting in an infrastructure buildout that doesn't align with actual MDHD charging behavior

Proposed reforms

- **Reform 3:** Develop framework that can optimize fleet and electric sector needs while meeting policy goals
  - Consider policy goals (e.g., air quality, DACs, and cost minimization) and mobility needs, which are the current and future truck routes that are inflexible from a fleet business perspective.
  - Identify MDHD charging zones, this could include:
    - “Ready-to-electrify” zones that don’t require major infrastructure investments
    - Optimal zones that best meet both business needs and energy or electric sector requirements (?) policy goals
    - Zones of highest priority for infrastructure development due to long lead time
    - Any other zone type that would prove useful to planning agencies and the market
- **Reform 4:** Explore the option for an interagency process for coordinated charging infrastructure funding that is informed by planning
- **Reform 5:** Establish inter-agency feedback loop between electric infrastructure planning and CARB to inform assessment of ACF and other ZEV regulations implementation

FIP – Proposed workflow diagram

FIP Implementation Assessment
Q1 – Q3 2023

Formal Integration of FIP Framework into Planning/Forecasting 2024

FIP Framework (Recurring Process)

- Update FIP inputs annually for use in planning/forecasting
- Identify optimal charger locations and associated electrical infrastructure biennially

Monitor deployment of charging and grid infrastructure relative to CARB ZEV regulations/timelines

Potential questions for FIP Assessment and FIP Framework

Below are the types of questions that the FIP Assessment and FIP Framework would attempt to address. The Assessment will address these questions for specific parts of CA and in less detail due to limited time.

- What is the amount of additional ZE freight infrastructure (hydrogen and electric stations) needed to support CARB's Advanced Clean Trucks and Advanced Clean Fleets rules?
- Where should the MDHD charging infrastructure and associated electric infrastructure be located?
- How much time will it take to build this infrastructure, does the timeframe align with CARB deadlines, and if not, what steps need to be taken?
- What is the cost of the transition to zero-emission freight, to both the ratepayer and freight businesses?
- What is the impact of MDHD electrification on grid reliability, especially local reliability?
- What is the impact of MDHD electrification on the state's ability to decarbonize the electric sector (e.g., affordability, reliability, supply-chain constraints etc.)?
- How should climate adaptation strategies be integrated into freight infrastructure planning?
- What are the market, regulatory, operational, technological barriers and potential solutions/reforms?

FIP Framework Proposal

FIP Framework Proposal – Process diagram

Step #1 – Develop common MDHD inputs (CPUC w/ CTC, CEC, & CARB)

1. Convene MDHD-centric stakeholder modeling advisory group (MDHD MAG)
2. Develop common inputs and assumptions for planning and forecasting, which are vetted by MDHD MAG.
3. Update deployment schedule for chargers based on ACF regulations and actual construction timelines

Step #2 – Develop scenario(s) of MDHD charging zones (CPUC w/ CTC & CEC)

1. Determine initial MDHD charging locations based on truck volume and truck routes by vehicle class.
   - En route and depot charging, short and long-haul routes, and routes that cross domestic/international borders
2. Develop charger zone scenario(s) that capture key risks and uncertainties. Electrical infrastructure timing/cost is not considered in initial scenario.

Step #3 – Rank MDHD charging zones based on electrical infrastructure impacts (IOUs w/ CPUC and ISO)

1. IOUs determine distribution and transmission costs for **step #2** scenario and sensitivities
2. CPUC with IOUs and ISO rank (e.g., red, yellow, and green) **step #2** charger zones based on cost and timing of associated electrical infrastructure relative to charger deployment schedule developed in **step #1.**

Step #4 – Develop reference case for least-regret MDHD charger locations (CPUC w/ CEC, CARB, & CTC)

1. Consult with the MDHD MAG on the following:
   - Mkt/reg/operational implications of scenario/sensitivity results and potential solutions to identified barriers
   - Develop least-regret charger zone base case by iterating between **step #3** and **step #4**. Least-regret base case reflects:
     – Minimal impact on freight from a biz cost and infrastructure timing perspective
     – Realistic timing for new electrical infrastructure
     – Doesn't compromise electric rates, reliability, or resiliency.
2. Establish inter-agency **HE working group** to vet CPUC's proposed base case. Similar to existing JASC process.
3. Adopt **step #4** base case and sensitivities biennially in TE proceeding
4. Adopt **step # 1** inputs annually in TE proceeding

Step #5 - FIP inputs/scenarios inform TE, DPP, IRP, Affordability, and IEPR

1. DPP
   a) Inform inputs for GNA/DDORs
   b) Inform GNA/DDORs MDHD sensitivity study plan
2. IRP
   a) Inform Unified Inputs & Assumptions doc
   b) Inform TE-related sensitivities, which will inform IRP's Preferred System Plan
   c) Identification of TE policy-driven transmission upgrades, which are transmitted to ISO TPP for study
3. TPP
   a) Identification of TE policy-driven transmission upgrades
   b) Local reliability
4. TE
   a) Direct step #7 behind-the-meter charging infrastructure funding
5. Affordability determination (TBD)
6. IEPR
   a) Inform scenario-based MDHD IEPR forecasting process that considers infrastructure and mkt risk identified in FIP process (TBD)

Potential frequency of updates

1. Step #1 – Annual process
2. Step #2 – Biennial process (even yrs.)
3. Step #3 - Biennial process (even yrs.)
4. Steps #4 - Biennial process (even yrs.)
5. Step #5 – Annual process
6. Step #6 – Biennial process (even yrs.)
7. Step #7 – Annual process

Inform CEC's AB 2127 report and CTC's SB 671 Clean Freight Corridor Assessment

Step #6 - Feedback loop between CARB's ZEV regs and infrastructure planning (CARB/CTC/CPUC/CEC)

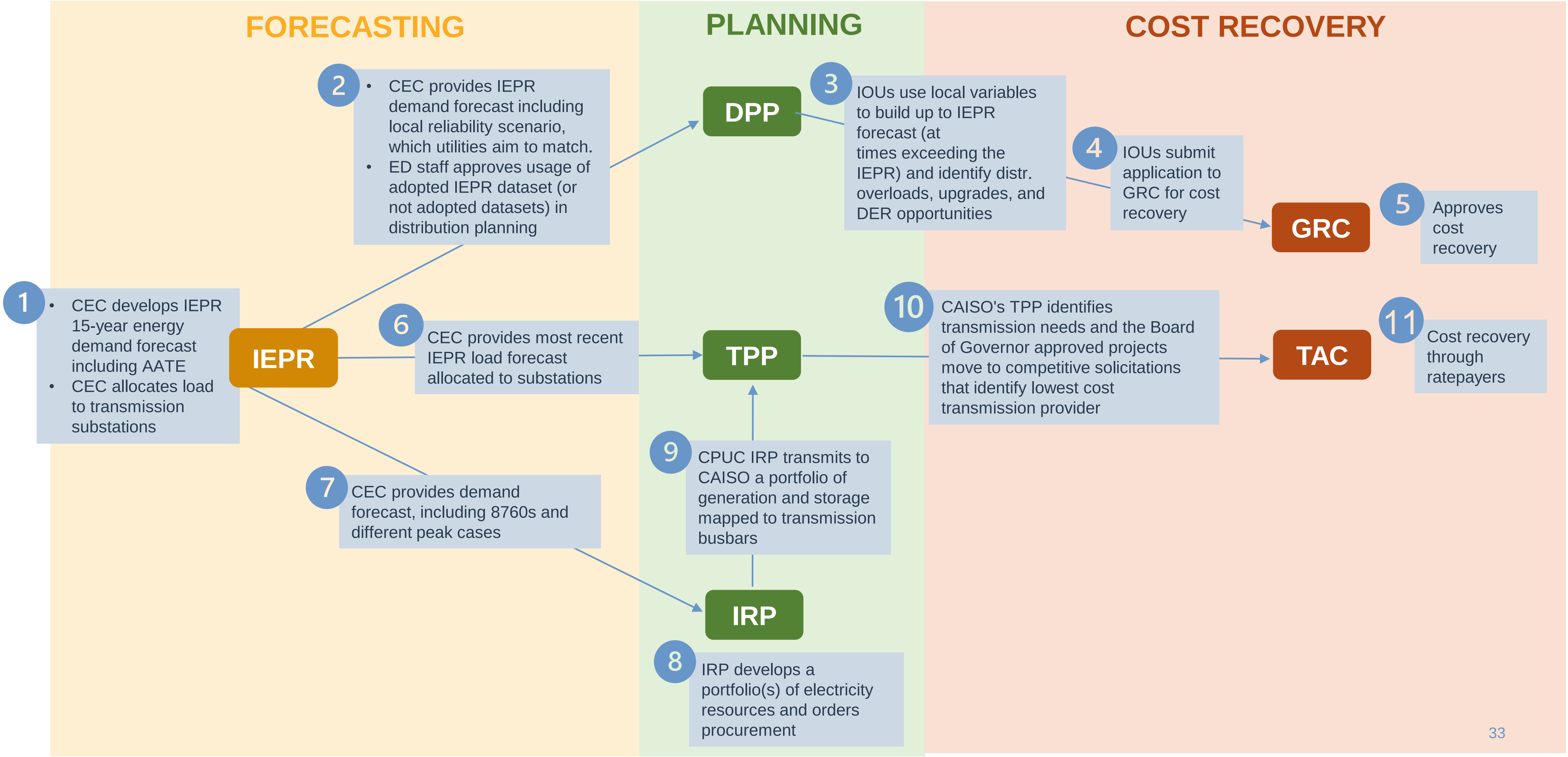
1. Provide information on grid readiness and barrier analysis to CARB as part of their ongoing assessment of ACF/ACT implementation

Step #7 - Use FIP grid readiness analysis to direct charger funding (CPUC w/ CEC & CTC)

1. Use **step #5** grid readiness results to inform CPUC MDHD behind the meter funding to optimal charger locations
2. Potentially inform other charging infrastructure programs, e.g., NEVI
3. Update **step #1** MDHD charger database with newly funded charging infrastructure

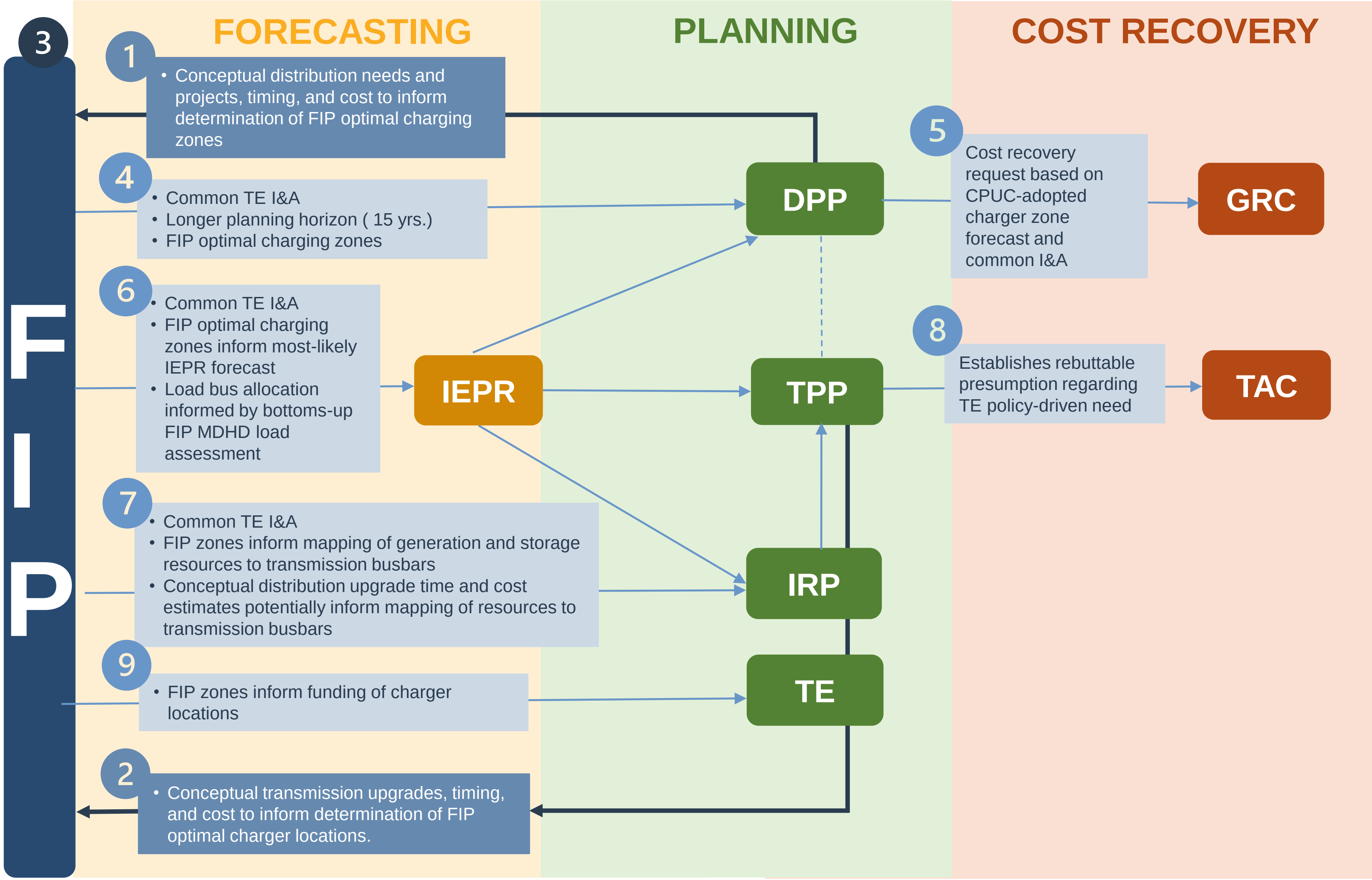
Process Reform to Support MDHD Electrification

Existing process interdependencies



How FIP could inform forecasting, planning, & funding

1. Distribution planning provides 15 year out distribution upgrade estimates to FIP **(Reform)**
2. CAISO provides transmission upgrade estimates to FIP **(Existing)**
3. FIP develops common TE inputs and assumptions (I&A) to be used across all forecasting/planning processes. Specifically, the I&A along with inputs provided under #1 and #2 are used to co-optimize distribution and transmission needs and identify optimal zones for EV charging infrastructure, "FIP zones" **(New).** Stronger linkage between DPP and TPP is needed
4. Use of the I&A and FIP optimal zones in DPP improves identification of distribution infrastructure needs in a timely manner **(Reform)**
5. FIP outputs bound longer-term cost recovery through GRC – moving beyond "just-in-time" planning **(Reform)**
6. Improvements to MDHD forecasting and a more granular allocation to load buses informs all planning processes, improving the accuracy with which infrastructure needs are identified **(Reform)**
7. Common I&A improves accuracy of quantity of generation and transmission need identified by IRP. Additionally, FIP optimal zones inform IRP mapping of generation and storage, used to approve new transmission lines **(Reform)**
8. FIP outputs support cost recovery justification under TAC **(Reform)**
9. FIP outputs inform funding to ensure deployment in identified locations **(New)**



FIP Implementation Assessment and Development of Common TE Inputs and Assumptions

FIP Implementation Assessment

- Objectives
- Process diagram
- Case study descriptions

FIP Implementation Assessment objectives

- Assessment objectives:
  - Establish initial set of inputs to inform development of common I&A for formal MDHD planning/forecasting
  - Identify potential planning/forecasting process reforms
  - Identify at a high-level the MDHD regulatory, market, and infrastructure barriers and potential solutions
  - Use lessons-learned to refine the scope of the FIP Framework
- Assessment will be indicative analysis and will not produce investment grade results (i.e., this analysis will not result in infrastructure authorizations)
- The assessment will analyze specific case studies that focus on a unique set of issues associated with freight electrification, e.g., drayage, electrifying domestic/international borders, local reliability, TE-driven transmission, and corridors with limited electrical infrastructure.
- The scope, timing, and deliverables of the proposed FIP Framework will be informed by the assessment.

2023 FIP Implementation Assessment

	Step 1: Define IOU identify MDHD cases studies	Step 2a: Identify MDHD charging locations	Step 2b: Develop MDHD inputs	Step 3: Rank MDHD electrical infrastructure alternatives	Step 4: Assess market/ regional/ operational implications	Step 5: Draft implementation assessment
	March 2023	April 2023	April 2023	May- June 2023	Q3/Q4 2023	Q3/Q4 2023
Collaboration	IOUs with CPUC	CTC with CEC and IOUs	CPUC with CTC, CEC, CARB & IOUs	IOUs with CPUC	IOUs/CPUC with CEC, CARB, CTC	CPUC/IOUs with CEC, CARB & CTC
Activities	1. Identify narrow area(s) within each IOU service area for assessment (e.g., Northern I-5, I-80, 710, or CA/Mexican border) 2. Focus each case study on unique reg/ mkt/ operational issues: e.g., drayage, electrifying domestic/ international borders, local reliability, TE-driven transmission, corridors with limited electrical infrastructure) 3. Develop sensitivities for each case study as appropriate (e.g., managed/unmanaged charging, % of depot charging, and delayed charger deployment, etc.)	1. Determine total charging stations required in designated area and planning years using CTC SB 671 results 2. Determine MDHD charging locations based on truck volume and truck routes by vehicle class (scenario for depot and in-route charging). 3. Alternatively, identify freight load at all relevant substations within case study area.	1. Develop common inputs and assumptions that will be used across all case studies (**Step 1**). 2. Agencies and IOUs vet inputs.	1.IOUs determine distribution and transmission costs for **Step 1** case studies and sensitivities 2.IOUs rank infrastructure alternatives based on cost/ timing of electrical infrastructure	1.Assess reg/mkt/operational implications for **Step 3** results of each case study and sensitivity. 2.Identify implications for infrastructure alternatives, including the schedule for permitting and construction of charger infrastructure. 3.Identify solutions and process reforms 4.Benchmark CEC 2022 TE load bus allocation using bottom-up load aggregation based on CTC and IOU-identified charger locations	1. Summarize results and conclusions 2. Propose modifications to the FIP purpose, scope, inputs, and methodology to ensure FIP can be scaled up and addresses fleet and electric sector needs/requirements. 3. Identify additional reforms or solutions in response to barriers identified in assessment.

Process Interdependencies

Use assessment to inform process reforms:
1. IEPR load bus allocation
2. TE program design/pilots
3. IRP inputs, scenarios, TE-driven transmission process
4. DPP inputs/assumptions
5. Potential DPP, IRP, and GRC reform
6. Potential IEPR forecast/scenario reform

Inform CARB ACF assessments and other ZEV regulations implementation

Summary of case studies

PG&E

Location: ~50 mile segment: Buttonwillow <-> Lebec. Southern portion of service territory where I-5 and Route 99 intersect.

Rationale: Rural area with existing capacity constraints. Anticipated freight electrification. High volume of interconnection requests and known EV charging growth.

Unique study question: How do capacity and grid infrastructure needs change over time (2030, 2035, and 2040)?

SCE

Location: 19 mile I-710 corridor. North-south interstate highway that connects San Pedro Bay Ports with east LA and city of Long Beach.

Rationale: Main route used by trucks to transport marine cargo containers to and from the Ports of LA and Long Beach, which is the largest seaport complex in the Western Hemisphere.

Unique study question: Assess grid needs in 2035. A sensitivity will assess difference in infrastructure needs assuming unmanaged charging vs. managed charging

SDG&E

Location: 5 mile radius capturing 805 and I-5.Otay Mesa Border Crossing Area

Rationale: Significant amount of freight crossing the CA/Mexico border

Unique study question: Assess grid needs to support electrification near international border
(study year: 2035)

Development of Common TE Inputs and Assumptions (I&A) for Forecasting/Planning

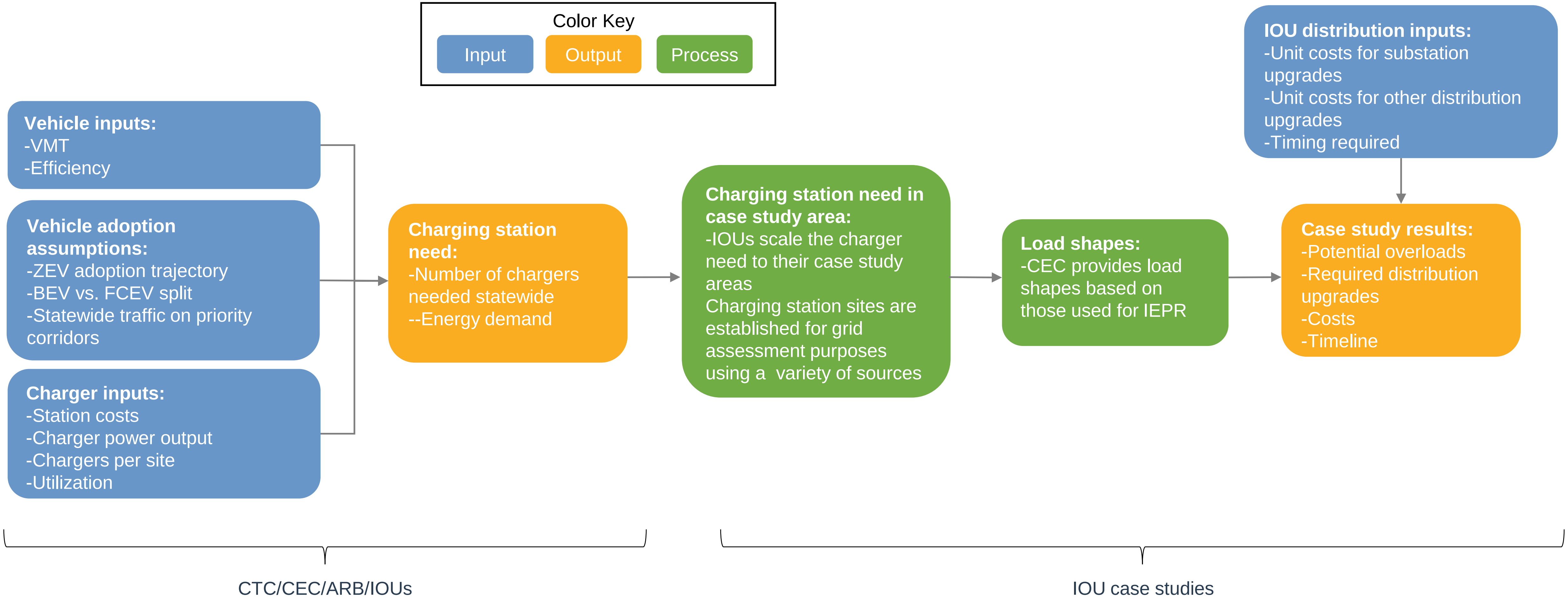
- Objectives
- Overview of the I&A process for the FIP case study
- Opportunities for interagency I&A alignment

Goals of inputs & assumptions process

Agencies and stakeholders must coordinate on what future they are planning for in order to make aligned and least regret investment decisions.

- **As the FIP framework develops into a more formal process, future I&A work will seek to:**
  - Establish a process for developing common MDHD inputs for use in state proceedings, including TE, High DER, IRP, IEPR, and GRC
- **In the near term, as part of the initial FIP case studies, the Inputs & Assumptions (I&A) process aims to:**
  - Document the key inputs and assumptions used in the case studies
  - Validate key inputs and assumptions and note deviation from other statewide inputs or studies
  - Inform future FIP process by flagging items for future work or additional coordination

Overview of the I&A process for the FIP case study



- This is the I&A development process for the case studies. Note - the development of common I&A will follow a similar process.

CTC information – key input to FIP case studies

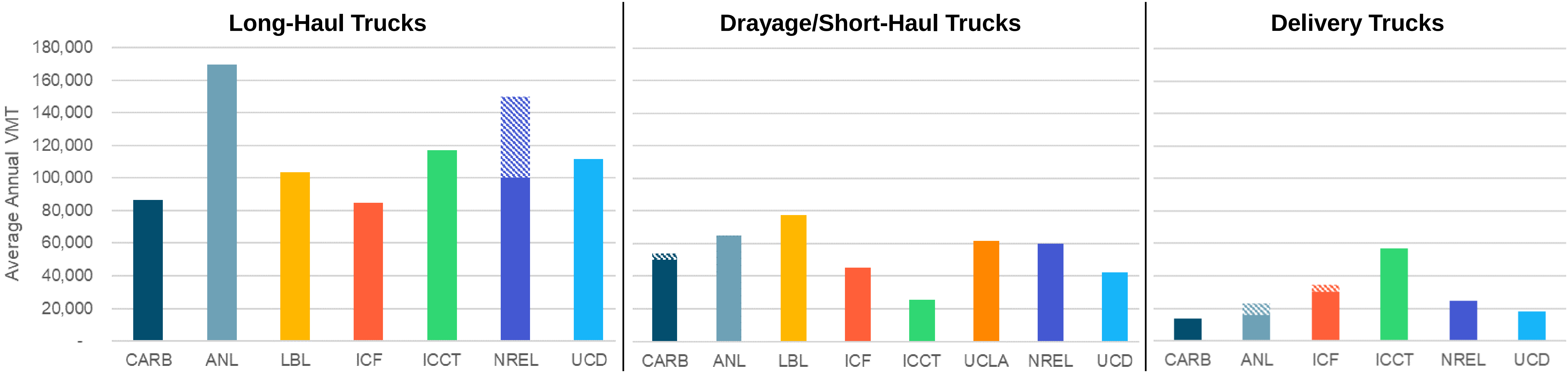
- For the FIP case studies, staff is using recent information developed by the CTC in response to SB 671, which requires the CTC to identify freight corridors and the infrastructure needed to support the deployment of zero emission MDHD vehicles
  - The CTC work identified six priority freight corridors, which informed our selection of case study areas
  - The CTC's Clean Freight Model projected the number of charging stations required to meet the state's goals
    - The implementation assessment group scaled down the CTC's projected statewide number of charging stations to specific case study areas to identify the number of needed stations in two of the case studies. These stations will then be mapped to specific locations and grid needs will be assessed.
- Per the objectives of the implementation assessment I&A process, CEC and CTC staff are reviewing inputs and assumptions to align them where possible and identify differences.
  - The IEPR forecast/scenarios is a standard input to state energy planning processes and energy sector investments.
    - Used by CPUC for IRP, CAISO for TPP, and IOUs for distribution and transmission planning
    - For this reason, it is used to benchmark other sources
- Caltrans and the CTC have their own established state transportation planning processes. SB 671 is an initial assessment. Long-term, the CPUC/CEC and the CTC/Caltrans should work to align planning processes and inputs.

Main differences in CTC model inputs compared to the CEC's IEPR

Input	CTC Model Source	CEC IEPR Source
California MDHD ZEV population forecast	CARB's estimate of vehicle population used in their SRIA for the Advanced Clean Trucks and Advanced Clean Fleets regulations	Developed by CEC to align with CARB regulations; Additional Achievable Transportation Electrification (AATE) 3 Scenario
Vehicle efficiency	UC Davis article Technology and Fuel Transition: Pathways to Low Greenhouse Gas Futures for Cars and Trucks in the United States	Calibrated to CARB's EMFAC model with some modifications
Annual VMT	CARB-recommended VMT summaries by vehicle class type from the Eastern Research Group, Inc. Heavy-Duty Vehicle Accrual Rates Final Report prepared for CARB.	CARB's EMFAC model

Input values vary widely between sources

- Vehicle miles traveled (miles/year) and vehicle efficiency (kWh/mile) are two key inputs for the case studies, but potential values for these inputs can vary across many different sources
- A recent UC Davis study[1] demonstrates the range of potential values for these two inputs (example for VMT shown below) from many data sources
- This demonstrates the importance of selecting common inputs & assumptions across state planning processes



Source: 1) Wang, Fulton, and Miller, “The Current and Future Performance and Costs of Battery Electric Trucks: Review of Key Studies and a Detailed Comparison of their Cost Modeling Scope and Coverage,” June 2022, https://escholarship.org/uc/item/8zj9462h

Opportunities for interagency I&A alignment

- Per the illustrative example on the previous slide, state planning processes must consider the risks and consequences of unintended inconsistencies in inputs and assumptions.
- Once completed, the lessons learned in developing I&A for the case studies will be used to develop common I&A to inform planning processes, per Reform #1. Interagency staff will jointly:
  - Establish a scope of work, schedule, and stakeholder process
  - Identify I&A inconsistencies and gaps
  - Determine which inconsistencies and gaps to address (some may be acceptable considering differing use cases)
  - Develop a common set of I&A
- We expect the common I&A will improve:
  - Regulatory efficiency
  - Stakeholder vetting
  - Interagency coordination
  - Transparency
  - Efficient use of ratepayer funds
  - Achievement of CA policy goals and CARB targets

Stakeholders Engagement

Stakeholder Engagement Schedule

Activity	Date
FIP Framework informal webinar	May 2023
Informal stakeholder comments due	June 2023
Preliminary FIP Implementation Assessment results published and informal webinar	Q3 2023
Staff Proposal on implementation of framework	Q4 2023
Formal workshop and opportunity for parties to file formal comments	Q4 2023
Implementation of recommendations for FIP Framework	2024

Instructions for Filing Stakeholder Comments

Filing Instructions:

- Please file comments within 30 days, by 06/21/23.
- Comments should be submitted via email to:
  - Paula.Gruendling@cpuc.ca.gov
  - Paul.Douglas@cpuc.ca.gov
  - Emily.Clayton@cpuc.ca.gov

Guidance for Preparing Comments:

- Comments must note the question number in each response. If comments reference a specific slide from this webinar, please include the slide number where applicable.
- There is no page limit for responses.
- Comments should include citations to any report or studies referenced; any reports or studies cited to must be publicly available.

How Comments Will Be Used:

- Comments will be posted on the FIP webpage.
- Comments provided by stakeholders are not part of any active proceeding. However, feedback received during and following the webinar may inform staff work products that may later be introduced into the formal record of a proceeding via a procedural vehicle (e.g., CPUC ruling) and stakeholders will then be able to provide formal comments.

Questions:

- Please reach out to Paula.Gruendling@cpuc.ca.gov and Paul.Douglas@cpuc.ca.gov with any questions.

Questions to Stakeholders

1. Do you agree with the purpose and objectives of the FIP proposal? If not, please provide suggested changes and a justification.
2. Are there any additional market, regulatory, operational, or infrastructure issues that need to be considered for the MDHD freight planning problem statement?
3. Given that FIP is planning for BEVs and FCEVs that will be dependent on long lead time electrical infrastructure, what changes would you make to the problem statement to capture the needs associated with LDV DCFC and hydrogen refueling? Are there any other vehicle classes that will have significant and localized impacts on electric infrastructure?
4. What changes to the MDHD FIP process, and associated inputs/outputs, are needed to capture the electrical infrastructure needs for LDV DCFC and FCEV?
5. Given the rapid acceleration of TE growth that is expected to occur between 2033 to 2045, does the FIP planning horizon need to be 20 years? If so, what process alignments and reforms are needed to ensure that the inputs developed outside of FIP consider a 20-yr time horizon and that the FIP 20-yr outputs can inform forecasting and planning appropriately?
6. In response to SB 671, CTC recently identified 6 high priority freight corridors and the charging infrastructure needed to support the deployment of zero emission MDHD vehicles. See Senate Bill 671 Workgroup (ca.gov) for more information about the analysis. Based on the CTC's initial analysis on priority ZEV freight corridors (see Slide 56 for summary), does the potential scale and timing of electrification require modifications to the FIP proposal?

Questions to Stakeholders

7. Do you agree with the proposal that FIP would identify optimal charging zones, which is aggregation of potential charger locations, versus specific charging sites? Under what conditions would FIP identify a specific charging site (e.g., very large DCFC station)? Please provide alternative proposals or definitions if needed.
8. To what extent do load serving entities (e.g., IOUs and POUs) need to coordinate on electrifying their respective corridor segments, which are adjoining? Is there a need for a statewide plan for coordinating MDHD electrification across LSEs? Your response should address the fact that the CPUC doesn't have jurisdiction over the POUs.
9. To what extent is MDHD electrification dependent on domestic/international borders being electrified concurrently?
10. If all the high priority corridors can't be electrified simultaneously, what is the process for establishing a sequence of electrification while ensuring fleet needs are being addressed? How should issues like equity and air quality be used to establish the sequence of electrification?
11. There is no planning process that identifies the long-term land acquisitions needed to upgrade existing substations or build new substations. What type of process is needed to identify long-term land acquisitions needs?
12. Now that electricity will be used to decarbonize MDHD, how does this change the definition of electric reliability and resiliency that the CPUC uses for system and distribution planning? Specifically, does the current expectations for reliable electrical service change when you factor in the needs of the freight industry?

Questions to Stakeholders

13. There are significant interactive effects between transportation electrification, building electrification, electric sector decarbonization, grid hardening, and affordability that are currently not being captured in planning. What additional process is needed to ensure that FIP captures these interactive effects and the potential tradeoffs that need to be considered?
14. How should climate adaptation strategies be integrated into the FIP framework and associated inputs? What process alignment with other proceedings, initiatives, studies is needed to ensure that climate adaptation strategies are considered in a coordinated manner within FIP and across proceedings/sister agencies?
15. Do you agree with the reforms that staff outlined on slides 26 and 27? What additional reforms beyond what staff proposed will be needed to appropriately plan for LDV DCFC and hydrogen refueling? Please provide a description and justification for any additional reforms
16. What steps can be taken to ensure that the proposed reforms capture potential intra- and inter-agency synergies while also avoiding duplicating existing or proposed processes?
17. What steps can be taken to ensure that the proposed reforms don’t duplicate existing or proposed IOU processes?
18. Caltrans and the CTC have their own established state transportation planning processes (e.g., SB 671 assessment). What process alignment is required to align CPUC/CEC and CTC/Caltrans TE-related forecasting and planning efforts?
19. The CEC’s IEPR TE demand forecast does not consider whether the electrical infrastructure needed to support TE adoption will be available per the compliance timelines stipulated in the ACF. To what extent should the IEPR process consider input from a grid readiness assessment developed in FIP that highlights potential infrastructure timing delays and other related uncertainties?

Questions to Stakeholders

20. To what extent is the IEPR MDHD load bus allocation (see slide 59), even with an AATE scenario that captures more uncertainty about the geography of charging load, appropriate for MDHD-related distribution planning?
21. How should the IOUs' bottom-up determination of MDHD load inform the development of the CEC's top-down statewide MDHD forecast and load bus allocation?
22. How should the FIP scope, purpose, outputs, and timing be incorporated into utility DPPs and GNA/DDOR filings?

    a) Could FIP inform DPP policy scenarios by developing optimal MDHD charging zones (see Reform 3) and provide them as an input to DPP?

    b) Could common TE inputs and assumptions established under FIP be used in distribution planning? Would this ensure that distribution planning results flowing into the GNA/DDOR filings could be more easily justified as investment-grade policy-driven needs?

    c) Slide 34 (box #1) identifies DPP as the source for the cost and timing of conceptual distribution upgrades needed to provide electrical service to the optimal charging zones identified in the FIP process. What changes would need to occur in the IOUs' distribution plana need for a 15-year planning horizon given the load growth post 2040?
23. Given the need to consider charging locations and cost-effective distribution/transmission upgrades concurrently when identifying optimal locations for MDHD chargers, what improvements to planning are needed to co-optimize distribution and transmission upgrades triggered by MDHD freight electrification

Questions to Stakeholders

24. The CAISO's TPP policy-driven assessment identifies transmission upgrades needed to support public policy requirements by studying various portfolios of generation and storage resources. In these studies, the load assumptions remain static to comply with the single forecast set agreement between the CEC, CPUC, and CAISO. Does the CAISO’s policy-driven transmission assessment sufficiently capture the localized load impacts of transportation electrification? If not, what changes to the inputs or methodology used in the demand forecasting process would you propose?

25. Currently, there is no linkage between planned distribution/transmission infrastructure investments and the federal/state funding available for charging infrastructure. To what extent should charging infrastructure associated with optimal distribution/transmission upgrades be subsidized using federal/state funds set aside for charging infrastructure? What would be the process for sending this investment signal to charger providers while avoiding market power issues and charger site speculation?

26. Please provide any additional comments as needed. Please note the slide number if you are responding to a point made in a particular slide in this presentation.

Back-up Slides

Potential clean freight corridor infrastructure summary

AS OF 05/05/2023 DRAFT PRELIMINARY – FOR DISCUSSION

Based on these scenarios, along these 6 priority corridors California could need:

556-1,832

Public BEV stations by 2040

63-1,736

Public FCEV stations by 2040

For comparison, **California currently has ~5,000 retail diesel stations statewide as of 2021**[4]

Along the ~1,968 road miles of the 6 priority corridors, the 556-1832 public BEV stations by 2040 would mean ~5,500-18,000 public chargers of varying types across the 3 adoption scenarios

Estimated numbers of BEV chargers (varying types) across charging stations, # *(Actual results may vary based on footnoted variables)*

	Accelerated battery electric adoption[1]	Balanced adoption[2]	Accelerated hydrogen fuel cell adoption[3]
2025	257	216	87
2030	3,676	2,286	1,135
2035	10,515	4,895	3,203
2040	18,317	7,793	5,561

1. This scenario is based on projections provided by the CEC (California Energy Commission)
2. Balanced scenario includes analysis of the following industry and data sources: I.H.S., ACT Research, American Trucking Association, Energy Information Administration, Alternative Fuels Data Center, Fleet manager surveys
3. This scenario is based on projections provided by Gualco
4. Statista 2021 accessed on May 5th, 2023

Other cross-cutting input assumptions include utilization, battery efficiencies, number of chargers per station, charging efficiencies, charging capacity factors, trip type, public vs. private etc. Infrastructure model assumes a BEV public station has 10 charging ports (BEV private stations have 20) and an extra-large hydrogen fueling station delivers 292,000 kg (643,750 lbs.) of hydrogen per year. Mix of charger type installed depends on type of station, i.e., whether public fast or overnight charging including AC fast L2, DC 50, DC 100, DC 150, DC 350, and DC 500 kilowatt chargers. VMT assumptions are based on CARB recommended accruals as of 2019. In the T7 tractor Class 8 category, a CEC estimate for VMT was used. Note: BEV – Battery electric vehicle; FCEV – Hydrogen fuel cell electric vehicle; powertrain adoption curves applied to California Air Resources Board (CARB) advanced clean trucks projections

CEC's Freight Forecast

The CEC's IPER forecast produces total truck energy by fuel type that can be used for planning infrastructure for freight electrification.

Key Inputs or Steps	Key Models and Sources Used
Economic and demographic forecast	Moody's Analytics
Existing truck stock	DMV Registration and HVIP Voucher Data
Vehicle miles traveled per vehicle	2021 EMission FACtor (EMFAC)
Truck usage	California Vehicle Use & Inventory Survey (CA-VIUS)
Fuel Types of New Truck Sales	Adapted Argonne Truck Choice Model
Truck attributes	Staff & Consultant Research
State Policies and Programs	CARB Regulations (ACT, ACF) and Programs (HVIP)
Freight Movement Demand	Freight Analysis Framework (FAF 5.0)

Forecast Demand of Vehicle Miles of Freight Movement (ton-miles) → Forecast Truck Usage (trucks needed per ton-mile) → Truck Population and Sales Forecast (trucks in population) → **Total Truck Energy by Fuel Type**

Other Initialisms/Acronyms: DMV = Department of Motor Vehicles; HVIP = California Hybrid and Zero-Emission Truck and Bus Voucher Incentive Program; CARB = California Air Resources Board; ACT = Advanced Clean Trucks Regulation; ACF = Advanced Clean Fleets Proposed Regulation

CEC’s Freight Forecast Results

Forecast Year	CARB ACT + ACF Zero-Emission Truck Population	CEC Zero-Emission Truck Population (AATE Scenario 3)	CEC Total MDHD GWh Demand (AATE Scenario 3)	CEC Total Statewide Electricity Consumption
2030	146,820	156,379	4,358 GWh	328,506 GWh
2035	360,109	385,452	11,579 GWh	358,738 GWh

- The CEC’s AATE Scenario 3 of the IEPR 2022 forecast reflects modeled impacts of two regulations from CARB: Advanced Clean Trucks and the recently adopted Advanced Clean Fleets.
- The discrepancy between forecasted zero-emission trucks between CEC and CARB is due to CEC reporting higher total truck counts while maintaining similar ZEV proportions required under ACF.

For this slide, zero-emission trucks refers to vehicles in Gross Vehicle Weight Rating Classes 3 through 8 with electric and hydrogen fuel types.
Other Initialisms/Acronyms: CARB = California Air Resources Board; ACT = Advanced Clean Trucks Regulation; ACF = Advanced Clean Fleets Regulation;
CEC = California Energy Commission, AATE = Additional Achievable Transportation Electrification

CEC Load Bus Allocation Process

Purpose

- The CEC's load bus allocation provides a substation-level disaggregation of the statewide IEPR forecast loads to be used by CAISO for transmission impact studies on the IEPR's Additional Achievable Transportation Electrification (AATE) Scenario 3. The type of substations vary by IOU territory but include at least A-level substations.

Process

- After the adoption of the IEPR electricity demand forecast, CEC staff use the statewide AATE Scenario 3 forecast as the starting point.
- Statewide annual electricity demand (in GWh) for medium- and heavy-duty trucks is disaggregated to ZIP codes using weighting from several data sources, including:
  - Freight movement data from California Statewide Travel Demand Model (CSTDM) by CalTrans
  - Diesel retail sales reported to CEC
  - Transportation Refrigeration Unit (TRU) applicable facilities data from CARB
  - Freight travel optimization created by Army Corps of Engineers for CTC
- ZIP code GWh are then further disaggregated to the transmission substation level.
- Load shapes are applied to the GWh, resulting in hourly assignments of load (in MW) for any requested hour, typically the peak hour of each year across a given TAC area (noncoincident) or CAISO as a whole (coincident).
- The final deliverables for CAISO are the transportation-related load impacts for IOUs and POUs at the hours requested by CAISO for the adopted 2022 IEPR AATE demand forecast.

Use Cases

- CAISO transmission impact studies
- IOU impact studies
- It is possible that the load bus allocation could be used for DPP; however, this does not appear to currently be done. Longer-term discussions of this integration may be merited via the FIP process.